New tech helps build stronger muscles – sans a workout

Older folk too frail to exercise may benefit from using machine

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Get stronger muscles without needing to exercise.
It sounded like fake advertising, or a claim too good to be true.
But now, a patent on the technology has been filed on STS, a machine to make the possible will soon be available to patients and thousands of older people who are too frail to exercise stand up again.

When Professor C.N. Lee of the Yong Loo Lin School of Medicine at the National University of Singapore (NUS) heard of research being carried out on the subject, he not only believed it, but also went further.

He persuaded the researcher, Associate Professor Alfredo Franco-Obregón from the Swiss Federal Institute of Technology, better known as ETH Zurich, to relocate to Singapore. "The data presented was very convincing scientifically," said Prof Lee. As a surgeon, he wanted to see if it could be used to improve outcomes, especially for older patients following surgery.

That was six years ago.

Today, a patent has been filed with NUS owning 80 per cent and ETH the remaining 20 per cent. The technology has been tested on patients at National University Hospital (NUH) and on a group of seniors in the community, and will be available commercially from the middle of next year.

The technology flows through a machine. Just 20 minutes on it, twice a week, for 10 weeks, and it has produced good results in most of the 69 participants, aged 50 to 89, who are members of gym Tonic run by the Lee Foundation for Seniors.

About 80 per cent saw at least a 10 per cent improvement in strength. On average, their legs were able to push 23 per cent harder, while two in three said they had less trouble with their daily activities. About 4 per cent did not benefit, while in per cent had some improvement.

Mr Museums Swiss, 77, used to lean on his umbrella while climbing the stairs. After 10 weeks on the machine, he climbed two stairs up to a temple and down again on a recent trip to South Korea without problems or aids. The retired senior office assistant said: "I have Spurs on my hip and calf that used to hurt when I walk. Now I can walk steadily for quite a distance without much pain."

The technology, called the Tonic Currents Electromagnetic Pulsing Systems, or Teps, involves the use of low-energy magnetic fields to stimulate cells in the muscles.

Exercise consumes energy. The magnetic field causes muscles to create energy. The net effect is the same – the production of energy. This is all muscles know and they respond the same way, explained Prof Franco-Obregón, who is now with NUH.

"The muscle doesn't know if it has been exercised. All it really understands is how much energy is used. It uses energy production as a feedback mechanism.

ASSOCIATE PROFESSOR ALFREDO FRANCO-OBREGON and members of the machine team (right)

In three and four weeks the Tonic Currents system has been exercised. All it really understands is how much energy is used. It uses energy production as a feedback mechanism," he said.

Based on this, the muscle creates energy and reaps the benefits that exercise would have brought.

Two clinical trials at NUH – one with 20 healthy people and the other with 20 patients after knee surgery – showed some benefits, with significant increase in muscle strength for the healthy group.

"We get very good changes in blood markers that indicate muscle regeneration, bone regeneration. We got blood markers that indicated a reduction in muscle breakdown and in bone breakdown," said Prof Franco-Obregón.

Why just 20 minutes and only twice a week?

He said that when it is too frequent, the cells stop responding to the stimulus. Too strong a magnetic field does not yield more benefits.

Mr Ivan Goh, chief executive of QuantumTX, the firm taking the machine to the market, said there is an initial increase in muscle mass, but this is coupled with a reduction in fat, resulting in only a slight gain in mass but a shift in underlying biology within the muscles.

To only a few tests are done, the other is just improving, he said.

The machine, on sale from mid-2020, will have a price tag of about $25,000. It may also be provided on a pay-per-use basis at around $30 a month, said Mr Goh.

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